PB89-229538

Superfund Record of Decision (EPA Region 7): Findett, MO (First Remedial Action), December 1988

(U.S.) Environmental Protection Agency, Washington, DC

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U.S. Department of Commerce
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Agency

Office of
Emergency and
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EPA/ROD/R07-89/023
December 1988

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EPA

Superfund Record of Decision:

Findett, MO

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16. Abstract (Limit: 200 words)

The Findett/Hayford Bridge Road Ground Water site is located just north of the City of St. Charles, in St. Charles County, east-central Missouri. The site lies 3.2 miles south of the Mississippi River and is within the floodplain. Land use in the site vicinity is primarily agriculture, but also includes a small industrial park containing Findett Corporation, Cadmus Corporation, and several other commercial and light industrial establishments. In addition, there are several residences within approximately 1,000 feet northeast and 1,500 feet south of the site. The Elm Point Wellfield, the primary drinking water supply for St. Charles, is located 1,800 feet northeast of the site. Until 1980, Findett Corporation reclaimed heat transfer fluids or oils, some of which contained PCBs, and received waste solvents for reclamation or recycling. Subsequently, Findett has custom blended or manufactured organic chemicals for other companies. The Findett site originally came to EPA's attention when Findett Corporation reported handling PCBs at the site. There is PCB-contaminated soil at the Findett facility as well as the adjacent Cadmus Corporation facility. The Elm Point Well Field is also at risk of contamination by releases from the site. Findett conducted several voluntary PCB soil cleanups pursuant to EPA Administrative Orders in 1981 and 1982; however, PCBs as well as VOCs remain in the soil in concentrations above
(See Attached Sheet)

17. Document Analysis a. Descriptors

Record of Decision - Findett, MO
First Remedial Action
Contaminated Media: soil, gw
Key Contaminants: VOC, organics (PCBs)

b. Identifiers/Open-Ended Terms

c. COSATI Field/Group

18. Availability Statement	19. Security Class (This Report) None	21. No. of Pages 43
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EPA/ROD/R07-89/023
Findett, Mo
First Remedial Action

16. Abstract (continued)

recommended levels. In addition, ground water investigations revealed substantial VOC contamination in the shallow aquifer near the contaminant sources and in the deep aquifer tapped by the nearby well field as a drinking water source. The primary contaminants of concern affecting the soil and ground water are VOCs, and other organics including PCBs.

The selected remedial action for this site includes onsite ground water pumping and treatment using air stripping with discharge to the publicly owned treatment works (POTW); and excavation of contaminated soil with either offsite disposal or treatment. The estimated present worth cost for this remedial action is $8,306,000 with annual O&M cost of $398,000.

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RECORD OF DECISION

DECLARATION

REMEDIAL ALTERNATIVE SELECTION

SITE NAME AND LOCATION

Findett/Hayford Bridge Road Ground Water
St. Charles County, Missouri

STATEMENT OF BASIS AND PURPOSE

This decision document presents the remedial actions selected for an operable unit at the Findett/Hayford Bridge Road Ground Water site in St. Charles County, Missouri. The operable unit (OU) at issue is the shallow contaminated ground water near the site. The selected remedial actions were developed in accordance with the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA) 42 U.S.C. §9601 et seq. and, to the extent practical, with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 C.F.R. Part 300. This decision was based upon the documents and information contained in the Administrative Record for the site. A copy of the Administrative Record is available for public review at the City Hall in St. Charles, Missouri.

The State of Missouri has been consulted with and concurs on the remedy selected for this operable unit.

DESCRIPTION OF THE SELECTED REMEDY

The U.S. Environmental Protection Agency (EPA) in consultation with the State of Missouri, has determined that the selected remedial actions, described and evaluated in the Operable Unit Feasibility Study (OUFS) and the Proposed Plan for remedial action (both of which are found in the Administrative Record and were released for public review and comment), satisfy or meet the criteria established by Section 121 of SARA, for the evaluation and selection of remedial actions, and will be protective of human health and the environment.

1.C

The remedial actions selected for the shallow contaminated ground water (Operable Unit) at the Findett/Hayford Bridge Road Ground Water site are described below:

-Hydraulic Control, consisting of ground water extraction wells near the suspected contaminant source (s), completed or screened in the upper granular unit. The EPA expects that approximately five (5) extraction wells will be needed. However, installation may be phased in, with the final number and location of extraction wells to be determined after review of the results of pumping of an initial extraction well or wells.

-Ground Water Treatment to Remove Organic Contaminants, using air stripping. An option for further treatment of ground water, using granular activated carbon (GAC), is retained. This option would be implemented only if monitoring determined that contaminants were not effectively removed by the air stripping and were present in potentially toxic concentrations or at levels which would interfere with the operation of the sewage treatment plant, to which treated water is to be discharged.

-Ground Water Discharge, after treatment to remove organic contaminants, to the local municipal sewage treatment plant which receives municipal and domestic wastewater from the City of St. Charles and surrounding areas.

-Contaminated Soil Removal, for offsite disposal or treatment. Surface and near-surface soils around the Findett Quench Pond are contaminated with polychlorinated biphenyls (PCBs) and other organic compounds. This contaminated soil may be a source of continuing ground water contamination and poses a threat of direct contact exposures to personnel on the Findett and Cadmus facilities. The contaminated soil will be removed to eliminate both the threat of direct contact exposures and a source of ground water contamination.

DECLARATION

The selected remedial actions are protective of human health and the environment, attain Federal, State and local requirements that are applicable or relevant and appropriate to the remedial actions and provides a cost-effective response. Section 121 of CERCLA identifies a statutory preference for treatment. This was a factor in EPA's selection of air stripping for the contaminated ground water to be extracted. Treatment, as well as disposal, will also be considered for the contaminated soil removed from the site.

The selected actions constitute operable unit remedial actions. Since these remedial actions result in hazardous substances, pollutants of contaminants remaining on the site, EPA shall review such remedial actions no less than once each five

years after initiation of the remedial actions for the site to assure that human health and the environment are being protected as required by Section 121(c) of SARA.

The remedial actions selected in this Record of Decision (ROD) directly address only the operable unit of the shallow contaminated ground water near the site. However, in selecting this remedy, EPA also believes implementation of this remedy will have a beneficial effect on environmental media outside the direct scope of this operable unit by controlling the source of the contamination and managing the migration of the contamination. In addition, the soil removal should reduce potential exposures via the direct contact route. A significant factor in the selection of the remedy for this operable unit is that it is consistent with achieving a permanent remedy at the site.

12-28-88
Date

Morris Kay
Regional Administrator

Attachments: Decision Summary
Responsiveness Summary
Transcript of Public Meeting
Index to Administrative Record

RECORD OF DECISION (ROD)

Findett/Hayford Bridge Road Ground Water

St. Charles County, Missouri

Prepared by:

U.S. Environmental Protection Agency (EPA)

Region VII

Kansas City, Kansas

December 1988

Decision Summary

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SECTION 1, SITE DESCRIPTION

1.1. Background and History

The Findett Corporation facility was the original facility addressed by EPA as a potential contaminant source. As a result much of the history on EPA's work at the site relates to Findett. The Findett site originally came to EPA's attention because Findett reported that they had handled polychlorinated biphenyls (PCBs) on the site. PCB-contaminated soil is still present on the Findett facility, as well as on the adjacent Cadmus Corporation facility. Early ground water monitoring at the Findett facility, conducted by Findett, was limited to PCBs. Although the presence of PCBs in ground water at the site has never been confirmed, PCBs have been found in subsurface soils beneath the water table. When EPA collected ground water samples at the site and conducted the chemical analyses, substantial concentrations of several volatile organic compounds (VOCs) were found. VOCs are also present in the soils at both the Findett and Cadmus facilities.

In 1984, partly because of the potential for ground water contamination and the threat posed to the nearby municipal drinking waster supply (Elm Point Well Field), EPA nominated the Findett site for the National Priorities List (NPL) of hazardous waste sites. At the present time the site's status on the NPL has not been resolved. Nevertheless, EPA Region VII has proceeded with the evaluation and planning for site cleanup.

In August 1987 field work was begun by EPA's contractor on the (Phase I) Remedial Investigation (RI). The investigation was focused on the ground water route because it was via this route that endangerment of public health was most likely to occur. A series of shallow and deep ground water monitoring wells were installed around the suspected contaminant source (s). Depths to ground water were measured in all monitoring wells near the site, including those installed as part of the RI as well as those previously installed by Findett. Ground water samples were then collected for chemical analysis from all monitoring wells. In order to confirm some critical contaminant values, some wells were resampled.

The results of the data and information gathered during the RI were summarized and evaluated in the RI Report. Substantial concentrations of VOC contamination were found in the shallow ground water near the contaminant sources. Initially contamination of the deeper ground water aquifer was not found. However, later sampling by EPA did find contamination of a deep ground water monitoring well, LA5, which is northeast of the

Findett facility. This well is generally downgradient of the suspected contaminant source and is the deep monitoring well nearest to the Elm Point Well Field.

In June 1988, EPA began the Operable Unit Feasibility Study (OUFS). In the OUFS, EPA evaluated alternatives for containing the shallow ground water contamination, in order to prevent the contamination from spreading in the shallow aquifer or reaching the deeper ground water, which is used for drinking water by the nearby Elm Point Well Field.

In November 1988, an EPA contractor conducted a supplemental field investigation to further identify the sources of ground water contamination. Four additional monitoring wells were installed in the shallow ground water. Ground water elevations were measured in all existing monitoring wells. Ground water samples were collected from all existing monitoring wells for chemical analyses. Subsurface soil samples were also collected during the drilling of the four new wells and analyzed for VOCs and PCBs. In general the contaminant levels previously reported in the RI were confirmed. However, contamination of a deep aquifer monitoring well, LA5, was found for the first time in this sampling.

On November 16, 1988 EPA released the RI Report, the OUFS and a Proposed Plan for remedial action for 21 days of public review and comment. The Proposed Plan provided additional detail on the remedial alternative recommended by EPA in the OUFS. A public notice of this opportunity for public comment was published by EPA in St. Charles and St. Louis newspapers on November 16, 1988. A public meeting was held in St. Charles (at City Hall) by EPA on December 5, 1988. During this public meeting the public was afforded the opportunity to ask questions or make oral comments on the documents released by EPA on this site. A transcript of the public meeting was prepared and is attached to this ROD.

Prior to the opening of the public comment period, EPA prepared an Administrative Record on the site, which was placed in the St. Charles City Hall, for the public's review. In addition to the RI Report, the OUFS, and the Proposed Plan, the Administrative Record includes the supplemental investigation report for the additional field work done for EPA after the RI was completed. Other relevant site records which were used by EPA in the preparation of the Proposed Plan and this ROD were also placed in the Administrative Record.

1.2. Site Location

The Findett/Hayford Bridge Road Ground Water site is located in St. Charles County, in eastcentral Missouri. The site is just north of the City of St. Charles, approximately 25 miles northwest of St. Louis. (See Figure 1, Area Map.) The site is in the floodplain of the Mississippi River, which is approximately 3.2 miles to the north. The Elm Point Well Field, which is the primary drinking water supply for St. Charles, is located 1800 feet northeast of the Findett plant site.

Loess bluffs form the southern or southwestern boundary of the Mississippi River floodplain and are located approximately one quarter mile south of the site. Land uses surrounding the site are primarily agricultural. A small industrial (Gardnerville) park on Elm Point Road and Governor Drive contains the Findett Corporation and Cadmus Corporation facilities and two other light commercial or industrial establishments, an excavating company ("Southern Property") and an insulation installation company (See Figure 1.). Much of the land in the area is as yet undeveloped and is used for hunting and trapping. Residences in the area are limited to a few farm homes on Huster Road approximately 1000 feet northeast of the site. A residential subdivision is located up on the bluff, approximately 1500 feet south of the site.

1.3. Hydrogeologic Setting

The site is located in the floodplain of the Mississippi River which is 3.2 miles to the north. The Missouri River is located about the same distance to the south. A series of ditches and creeks in the area drain to Dardenne Creek, which then flows into the Mississippi River.

Available data (including that from the RI) indicate that there may be two alluvial ground water systems beneath the site. (See Figure 2.) This description of site hydrogeology is limited to the area for which monitoring wells were installed during the RI. (See Figure 3.) The degree of connection, if any, between these two systems, has not been conclusively determined and continues to be evaluated. The upper ground water unit begins at the water table, 3-8 feet below ground surface. Soils containing water in this zone consist of a fractured or blocky silty clay, 25-40 feet thick, underlain by a sand layer 5-25 feet thick. (See Figure 2.)

Beneath the upper sands is another clay layer, which appears to be more cohesive with fewer fractures than the upper clay. The lower clay, ranging from 10 to 40 feet thick, is believed to be more of a barrier to the downward transport of contaminants at or near the surface.

Beneath this second clay layer are the deeper sands, which extend down to the top of limestone/sandstone bedrock, generally 70-90 feet below ground surface. The lower sand layer is the most important aquifer in the area and is at the same depth from which municipal drinking water for the Elm Point Well Field is drawn. The two separate clay layers identified in the project monitoring wells do not exist at the Elm Point Well Field. Boring logs for these wells show only one water bearing sand and gravel layer, with no intervening clay layers. It is assumed that the upper granular unit (e.g. sand) beneath the site pinches out northeast of the site, somewhere between the site and the Elm Point Well Field.

Ground water flow directions and rates were measured and evaluated several times throughout the RI/FS. Ground water flow in the upper sands appears somewhat different than in the lower sands, supporting the supposition of two separate ground water units. Ground water flow in the upper sands tends to be predominantly to the north of the Findett and Cadmus facilities. (See Figure 4.) The expected ground water flow velocity in the upper unit is estimated to be on the order of one (1.0) foot per day. Ground water flow direction in the lower sands tends to be northerly, although a northeast component of flow has been noted. (See Figure 5.) Ground water flow velocity in the lower sands is estimated to be in the range of four (4.0) feet per day.

At present, known ground water use in the area is limited to the Elm Point Well Field, which has seven large (800-1000 gallon/minute) volume production wells. The nearest of these wells is located 1800 feet northeast of the Findett plant site. Ground water contamination is known (based upon sampling and analysis of ground water in the RI) to exist at least as far as monitoring well UA2 (190 feet north of Findett property line) in the upper ground water system. (See Figure 6 for summary of known ground water contamination existing at the conclusion of the Phase I Remedial Investigation.) When the OUFS was prepared contamination of deeper ground water had not been verified. Deep aquifer monitoring well LA5 has since been found to be contaminated with VOCs.

Additional potential uses of ground water exist in both the shallow and deep ground water systems. Findett has a deep production well which reportedly has not been used as a water

supply. Nearby property owners could also drill shallow or deep alluvial wells to use ground water for drinking, agricultural or industrial uses.

Recent data from a supplemental investigation done by EPA (Jacobs Engineering Group, TES IV Contractor, October 1988 Report) indicate that the upper and deeper ground water systems may be connected. A slug test was conducted in conjunction with a source identification investigation after the remedial investigation. Fluctuations in shallow ground water elevations were noted when the only known pumping of ground water in the area was of the deep ground water by the Elm Point Well Field. In addition contamination (1400 ug/l total VOCs) was noted in monitoring well LA5 in the deep aquifer. (Refer to Figure 7 for a summary of the contaminant levels from the source identification investigation, in which deep ground water contamination was first verified.) This increases the risk of contamination of the the Elm Point Well Field and could preclude other potential uses of the deep alluvial aquifer. The EPA resampled a number of wells in late November 1988. Contaminants attributable to this site were <u>not</u> found at detection limits in a water sample from the Elm Point Well Field. VOCs were again found in LA5, but in lower concentrations than in October 1988 (e.g. 69 and 61 ug/l total VOCs in duplicate samples).

1.4. Enforcement Actions

The Findett Corporation has addressed PCB contamination on its facility. Several voluntary PCB soil cleanups have been conducted by Findett. One of these was conducted by Findett pursuant to an Administrative Order issued by EPA in 1981 under Section 311 of the Clean Water Act. Findett also monitored ground water for PCB contamination under a Consent Administrative Order issued in 1982 under Section 3013 of the Resource Conservation and Recovery Act (RCRA).

PCBs remain in the surface and near surface soils in concentrations above levels recommended as safe by EPA. PCBs up to 5400 mg/kg are present in surface soils on Findett and up to 6000 mg/kg in soils on Cadmus. The Findett Corporation has expressed a desire to remove additional PCB-contaminated soils on its property and to cap or cover any remaining residual contamination. A plan for the PCB cleanup has been submitted by Findett for EPA review.

At the time EPA began the RI the only known Potentially Responsible Party (PRP) was the Findett Corporation. The EPA sent a Notice Letter under Section 104 of CERCLA to the Findett Corporation advising them of the need for an RI/FS at the site

conduct the RI/FS. The EPA, therefore, conducted the RI/FS advising Findett that they, and any other PRP, may be held liable for the costs of the work performed by EPA. Subsequent environmental sampling by EPA now indicates that there may be additional contaminant sources and additional PRPs, including the Cadmus Corporation. The EPA is following up on this.

1.5. Community Relations

A Community Relations Plan (CRP) was developed and implemented by EPA for the site. The RI Report, the OUFS, and the Proposed Plan for remedial action were released by EPA on November 16, 1988, for a 21 day public review and comment period. Public notices of this opportunity for review and comment were placed in St. Charles and St. Louis newspapers. These and other documents relating to the site were placed in the Administrative Record on the site for the public's review. Copies of the Administrative Record are located both at the St. Charles City Hall and in EPA Region VII's Docket Room in Kansas City, Kansas.

A public meeting was held in St. Charles at the City Hall on December 5, 1988, during which oral comments on the RI Report, the OUFS and the Proposed Plan were received, and questions on the proposed actions were responded to. A Responsiveness Summary has been prepared as part of this ROD addressing all the substantive oral and written comments received.

SECTION 2, SUMMARY OF THE REMEDIAL INVESTIGATION (RI)

2.1. RI Objectives

The Phase I RI was limited to the ground water route, because releases via this route could pose the greatest threat to human health and the environment. The OUFS addressed the shallow contaminated ground water as an operable unit. The purposes of the Phase I RI were to: 1) identify and quantify contaminants present in ground water; 2) identify ground water flow patterns and gradients; and 3) identify potential human exposure from ground water contamination and adverse environmental impacts.

2.2. (Phase I) Remedial Investigation Activities

The following investigative activities were completed in the RI.

-A series of 4 additional shallow monitoring wells were installed. Detailed boring logs were kept noting the subsurface soil types encountered.

-Five deep monitoring wells were paired with each shallow well installed and with one existing shallow well.

-Ground water elevations were measured in all newly installed wells, along with older monitoring wells installed by Findett under a RCRA 3013 Consent Order. Directions and rates of ground water flow were determined from review of this data.

-Newly installed and previously existing monitoring wells were sampled. Ground water samples were analyzed for hazardous substances.

A supplemental investigation was conducted by EPA to more specifically identify contaminant sources (Jacobs Engineering Group, TES IV Contractor, October 1988 Report). This investigation included:

-Four additional shallow monitoring wells were installed, two on the Findett property, one on the Cadmus property (upgradient of Findett) and one on the "Southern" Property, upgradient of Cadmus.

-Ground water samples were collected from all new monitoring wells and most of the older monitoring wells. Water samples collected were analyzed for VOCs.

-Subsurface soil samples were collected during the drilling of the four new wells and analyzed for VOCs.

-Ground water elevations were again taken in all older monitoring wells in order that current ground water flow directions could be determined.

-A slug test was performed on one shallow to determine the hydraulic properties of the ground water systems.

Contaminant levels in ground water and subsurface soils from the analyses of these samples are summarized in Figures 7 and 8.

2.3. Remedial Investigation Results/Nature of the Problem

Significant levels of PCB contamination have been found in surface and near-surface soils at both the Findett and Cadmus facilities. PCBs have not been confirmed in ground water samples collected. One "borehole water" sample collected by EPA at the Findett facility contained PCBs; however this is believed to have resulted from the inadvertent introduction of sediment into that water sample during collection. PCBs have not been found in any true ground water samples.

Substantial concentrations of VOCs have been found in onsite shallow ground water, well above levels at which EPA would recommend for human consumption. (See Figures 6 and 8,

previously referenced.) At the conclusion of the Phase I RI, significant contamination of the deeper ground water had not been verified. Subsequently a water sample from a deep well (LA5) was found to contain VOCs in excess of 1400 ug/l, well above any level recommended for human consumption. In a third water sample collected from this well in November 1988 VOCs were again found, but in lower concentrations (e.g. 61 and 69 ug/l total VOCs), although still above levels acceptable in drinking water.

The public drinking water supply (Elm Point Well Field) was sampled by EPA under this project. No VOCs, PCBs or other contaminants attributable to the site were found. Data available to EPA have not shown any contamination of the drinking water supply attributable to this site.

The direction of ground water flow is generally to the north in both the upper and deeper systems. (See Figures 4 and 5.) Direction of flow tends to fluctuate from the northeast to northwest. Water from the Elm Point Well Field is at risk of contamination by releases from the site. Although the direction of flow is not directly to the well field (northeast), contaminants may still reach it, especially if the lower clay layer separating the upper and deeper ground water is absent north of the site, or if the two systems are hydraulically connected.

The Elm Point Well Field is the only drinking water supply, public or private, known to be at risk of contamination. However, other potential uses of ground water for drinking, agriculture, or as process water could be precluded by contaminants released from the site. VOCs pose the greatest threat to actual and potential ground water users, because of their solubility in water. PCBs, other organics, and metals pose less of a threat because of lower solubility in water, and because they are present in ground water in lower concentrations, if at all.

The VOCs and PCBs present in surface and near-surface soils (Figure 7) pose a threat of continued contaminant release to ground and surface water. VOCs and PCBs also pose a threat via direct contact exposures, on the Findett and Cadmus facilities. These operable unit remedial actions do not directly address surface water or direct contact exposures. (However, it is recognized that any source control measures, such as Findett's PCB soil removal, taken to abate ground water contamination would also reduce the threat of direct contact exposures and contamination of surface water.) The goal of this OUFS is to

contain the known contamination in the shallow ground water system. The remedies selected to achieve this goal may also result in protection of the deeper ground water and onsite shallow ground water restoration (i.e. cleanup).

SECTION 3, DOCUMENTATION OF SIGNIFICANT CHANGES

Section 117(a) of CERCLA/SARA requires that a Proposed Plan for remedial action be prepared by EPA and released with the Feasibility Study for public review and comment. The Proposed Plan highlights key information from the RI and FS reports, briefly described the alternatives for site remediation and identifies the preferred alternative and the rationale. EPA released the Proposed Plan and the OUFS, along with the RI Report, for public review and comment on November 16, with a 21-day comment period.

Section 117(b) of CERCLA/SARA further requires that any significant changes in the remedy or response actions selected in the ROD as remedial actions, that differ from those recommended in the Proposed Plan, be described along with the reasons for such changes. The response actions recommended in the Proposed Plan are the same as those selected in this ROD.

SECTION 4, REMEDIAL ALTERNATIVES EVALUATED

The Operable Unit Feasibility Study (OUFS) process for developing and evaluating remedial actions for a site includes: identifying suitable remedial technologies; screening the technologies; developing preliminary remedial action alternatives using technologies passing the screening; detailed analysis of the alternatives based on implementability, effectiveness, and cost, as well as compatibility with likely final remedial actions for the site.

4.1 Most Probable Site Conditions and Reasonable Deviations

All of the information currently available for the site was used to fashion a conceptual model of the site conditions. The model provides the most informed assessment of the site by defining the set of environmental conditions most likely to exist at the site. The conceptual model also acknowledges that certain data gaps and uncertainties currently exist by identifying and defining reasonable deviations from the most probable site conditions. These deviations, which encompass the nature and extent of contamination and site hydrogeology, could affect the implementation of a remedial action. The alternatives that were evaluated in detail address only the most probable site conditions. Mitigation measures were formulated to address the reasonable site deviations and were costed out in order to allow

responses to be developed that could also respond to the deviations which may be encountered, with minimal changes and cost impacts.

4.2 Remedial Alternatives

Potentially applicable technologies were identified for containment, treatment and discharge of contaminated ground water. Extraction wells, injection wells, and physical barriers were found potentially applicable for ground water containment. Several technologies were found potentially suitable for physical or chemical treatment of contaminated ground water, and for discharge or recycling/reuse after treatment.

In the OUFS eleven preliminary remedial actions were assembled into a range of alternatives using the technologies identified. These eleven alternatives were initially screened for effectiveness, implementability, and cost to reduce the number of alternatives to be evaluated in greater detail. The initial screening carried the following remedial actions alternatives forward for detailed evaluation.

-Alternative 3. Hydraulic control using extraction wells located in the area of known contamination, with treatment of organic contaminants and inorganics prior to discharge of treated water to Dardenne Creek.

-Alternative 4. Hydraulic control using extraction wells located in the area of known contamination, with treatment of organic contaminants prior to discharge of treated water to the sewage treatment plant.

-Alternative 6. Hydraulic barrier using extraction wells located downgradient of the area of known contamination, with treatment of organic contaminants and inorganics prior to discharge of treated water to Dardenne Creek.

-Alternative 7. Hydraulic barrier using extraction wells located downgradient of the area of known contamination, with treatment of organic contaminants prior to discharge of treated water to the sewage treatment plant.

SECTION 5, SUMMARY OF THE COMPARATIVE ANALYSIS OF THE ALTERNATIVES

The alternatives described in Section 4 were evaluated in terms of applicability to overall site remediation. They were also evaluated using evaluation criteria presented in EPA Directive 9355.01, "Draft Guidance on Preparing Superfund Decision Documents: The Proposed Plan and Record of Decision". These criteria relate to factors mandated in Section 121 of CERCLA/SARA, and considerations of overall feasibility and acceptability of the remedy. These nine criteria are as follows:

-Protection of human health and the environment,
-Compliance with applicable, or relevant and appropriate regulatory requirements (ARARs),
-Long-term effectiveness and permanence,
-Short-term effectiveness,
-Reduction of (waste) toxicity, mobility or volume,
-Implementability,
-Cost,
-State acceptance, and
-Community Acceptance.

Table I, is excerpted from the OUFS (Table 6-3), and evaluates the short-term effectiveness, long-term effectiveness and permanence, reduction of waste (toxicity, mobility or volume), implementability, compliance with ARARs, protection of human health and the environment, and applicability to overall site remediation criteria. Table II below, is excerpted from the OUFS (Table 6-4 from the OUFS) and evaluates the cost criterion for the alternatives. Additional detail on the costs of the alternatives evaluated can be found in the narrative of the OUFS in Chapter 6.

TABLE II

ALTERNATIVES COST SUMMARY
(1988 Dollars)

Alternative	Cost	Capital O&M Cost ($X1000)	Annual Present Worth ($X1000)	30-Year ($X1000)
3		2,890	667	13,604
4		1,883	398	8,306
6		2,938	670	13,704
7		1,930	402	8,426

* At 5% discount Factor

The criteria of State acceptance and community acceptance of the various alternatives are discussed in Table III.

TABLE III, EVALUATION OF DEGREE OF STATE AND COMMUNITY ACCEPTANCE OF THE ALTERNATIVES

	State Acceptance	Community Acceptance
Alternative No. 3 - Hydraulic control using extraction wells in the area of contaminant sources, with treatment of organic contaminants and inorganics prior to discharge of treated water to Dardenne Creek.	The EPA believes the State (of Missouri) finds this alternative acceptable.	The EPA believes that, in general, the community finds Alternatives Nos. 3, 4, 6 and 7 to be equally acceptable. Nearby property owners would probably prefer Alternatives 3 and 4 to 6 and 7. Alternatives 3 and 4 preclude fewer offsite property uses than 6 and 7.
Alternative No. 4 - Hydraulic control using extraction wells in the area of contaminant sources, with treatment of organic contaminants prior to discharge of treated water to the sewage treatment plant.	EPA believes the State finds this Alternative to be acceptable.	Same as for Alternative No. 3
Alternative No. 6 - Hydraulic barrier using extraction wells downgradient of known contamination, with treatment of organic contaminants and inorganics prior to discharge of treated water to Dardenne Creek.	The EPA believes that the State agrees that Alternatives 6 and 7 are less effective than Nos. 3 and 4 if other than expected hydrogeologic conditions are encountered. EPA believes the State prefers Alternative Nos. 3 to Alternative Nos. 6 and 7, because ground water extracted in Alternative No. 4 would probably be more heavily contaminated. Alternative No. 6 would therefore be less effective than Alternative No. 3.	In general, the same as for Alternatives Nos. 3 and 4. Marginally less acceptable to adjacent property owners.
Alternative No. 7 - Hydraulic barrier using extraction wells downgradient of known contamination, with treatment of organic contaminants prior to discharge of treated water to the sewage treatment plant.	Same as for Alternative No. 6.	In general, the same as for Alternative Nos. 3 and 4. Marginally less acceptable to adjacent property owners.

TABLE III, EVALUATION OF DEGREE OF STATE AND COMMUNITY ACCEPTANCE OF THE ALTERNATIVES

	State Acceptance	Community Acceptance
Alternative No. 3 - Hydraulic control using extraction wells in the area of contaminant sources, with treatment of organic contaminants and inorganics prior to discharge of treated water to Dardenne Creek.	The EPA believes the State (of Missouri) finds this alternative acceptable.	The EPA believes that, in general, the community finds Alternatives Nos. 3, 4, 6 and 7 to be equally acceptable. Nearby property owners would probably prefer Alternatives 3 and 4 to 6 and 7. Alternatives 3 and 4 preclude fewer offsite property uses than 6 and 7.
Alternative No. 4 - Hydraulic control using extraction wells in the area of contaminant sources, with treatment of organic contaminants prior to discharge of treated water to the sewage treatment plant.	EPA believes the State finds this Alternative to be acceptable.	Same as for Alternative No. 3
Alternative No. 6 - Hydraulic barrier using extraction wells downgradient of known contamination, with treatment of organic contaminants and inorganics prior to discharge of treated water to Dardenne Creek.	The EPA believes that the State agrees that Alternatives 6 and 7 are less effective than Nos. 3 and 4 if other than expected hydrogeologic conditions are encountered. EPA believes the State prefers Alternative Nos. 3 to Alternative Nos. 6 and 7, because ground water extracted in Alternative No. 4 would probably be more heavily contaminated. Alternative No. 6 would therefore be less effective than Alternative No. 3.	In general, the same as for Alternatives Nos. 3 and 4. Marginally less acceptable to adjacent property owners.
Alternative No. 7 - Hydraulic barrier using extraction wells downgradient of known contamination, with treatment of organic contaminants prior to discharge of treated water to the sewage treatment plant.	Same as for Alternative No. 6.	In general, the same as for Alternative Nos. 3 and 4. Marginally less acceptable to adjacent property owners.

SECTION 6, SELECTED ALTERNATIVE

The EPA reviewed the data and the information from the Phase I Remedial Investigation, the supplemental field investigation, and the Operable Unit Feasibility Study. The EPA has selected the following remedial actions recommended in the Proposed Plan for implementation as the remedial actions for the shallow contaminated ground water operable unit.

Alternative No. 4, Hydraulic Control using extraction wells in the area of contaminant sources, with Treatment of organic contaminants prior to Discharge of Treated Water to the Sewage Treatment Plant is the selected alternative. The specific and detailed analyses leading to this selection are contained in Tables I, II, and III of this ROD, the Proposed Plan and in the OUFS. In summary the advantages of Alternative No. 4 over the other alternatives are as follows:

-Hydraulic control alternatives (pumping of contaminated ground water near the contaminant source) should be more effective than the hydraulic barrier alternatives (pumping of downgradient ground water) in responding to changes in hydrogeologic conditions such as a change in the direction of ground water flow direction. For example, if ground water flow were to be altered by the pumping of new, large volume process wells, barrier extraction wells might not effectively contain the ground water contamination. Hydraulic control extraction wells would still be effective, even if the direction of ground water flow were to change. In addition, hydraulic control is likely to pump more heavily contaminated ground water than would hydraulic barrier extraction wells. It is more effective to pump more heavily contaminated water, rather than to allow it be diluted and end up pumping a larger volume of less heavily contaminated water. Ultimately, aquifer restoration (e.g. cleanup) will be achieved quicker if more heavily contaminated ground water is pumped.

In general, Alternatives 3 and 4, hydraulic control, appear to fit better with overall site remediation, and are preferred for this reason.

Hydraulic control wells will be more easily installed than hydraulic barrier wells. More adjacent property would be lost to barrier extraction wells, than to hydraulic control extraction wells. This makes it more difficult for EPA, or the potential responsible parties, to obtain the necessary site access. A few additional monitoring wells could be needed to monitor the effectiveness of hydraulic control alternatives. Many more additional monitoring wells would be required to monitor the

effectiveness of hydraulic barrier alternatives. This increases cost, and again makes site access more difficult to obtain for the hydraulic barrier alternatives than for hydraulic control.

Alternative No. 4, which discharges to the Sewage Treatment Plant, requires significantly less pretreatment of extracted ground water than does alternative No. 3, which discharges to Dardenne Creek. As a result Alternative No. 4 is significantly less expensive than No. 3, while affording equal protection of human health and the environment. Because No. 4 requires less treatment than No. 3, the treatment system will be easier to maintain and may be more reliable. For these reasons EPA selects Alternative No. 4.

The EPA has coordinated the development of the selected remedial actions with the City of St. Charles, Missouri. The nearby Elm Point Well Field withdraws ground water for drinking for the City. The sewage treatment plant to which the treated water would be discharged is also operated by the City.

Contaminated soils will be removed for offsite disposal or treatment. In addition to removing the threat of potential direct contact exposures, EPA believes this removal would also remove some of the sources of continuing contaminant releases, and threats of releases, of contaminants to ground water.

SECTION 7, STATUTORY DETERMINATIONS

Based upon all of the available information, the selected remedial action satisfies the remedy selection requirements under CERCLA/SARA and the NCP. The selection remedial action is protective of public health and the environment, meets all applicable or relevant and appropriate requirements, and is cost-effective. Treatment has been selected for the contaminated ground water to be extracted. Treatment will be considered for the contaminated soil to be removed.

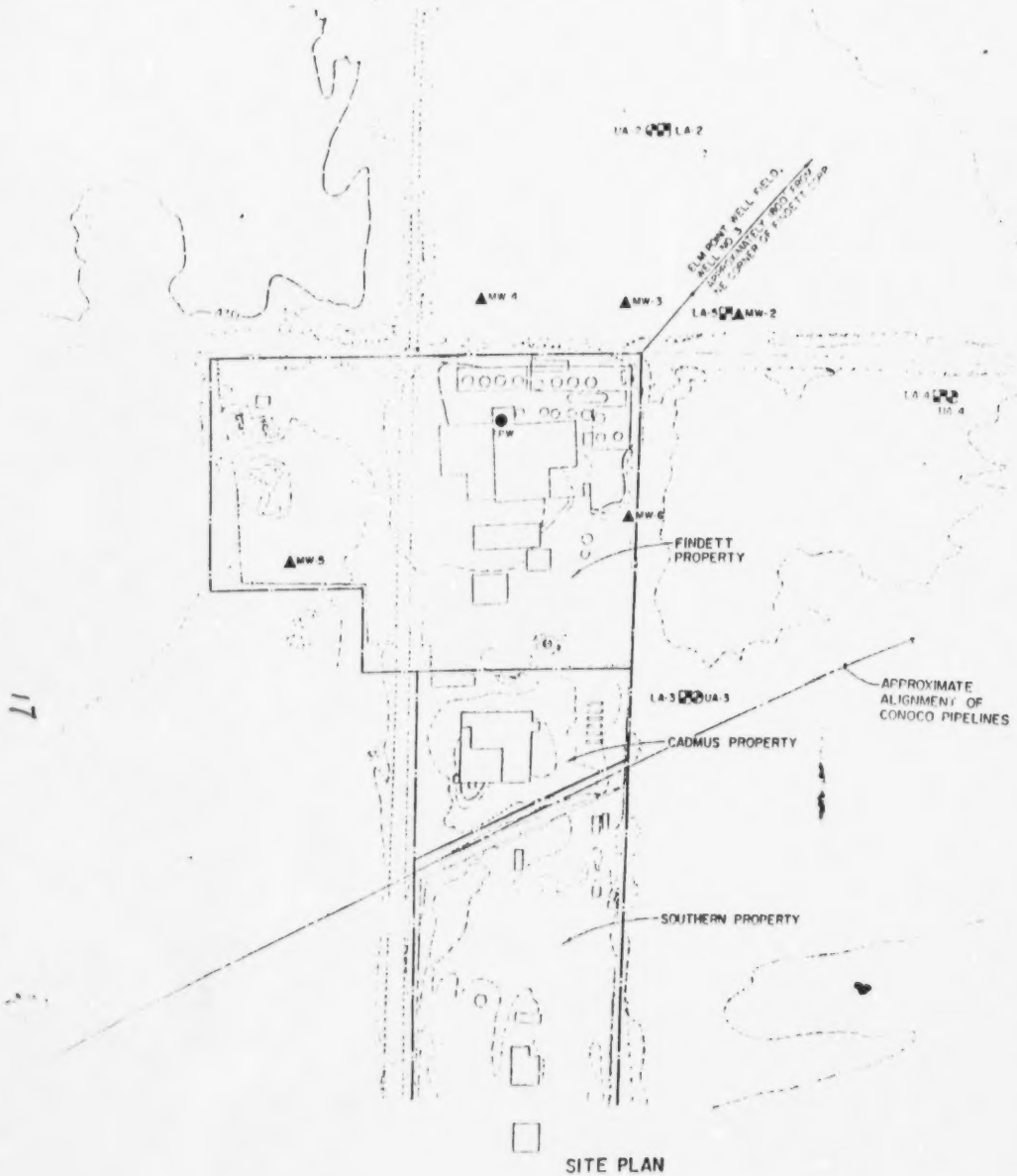
The selected actions constitute operable unit remedial actions. Since hazardous substances, pollutants or contaminants will remain on the site, EPA shall review such remedial actions no less than once every five years after initiation of the remedial actions to assure that human health and the environment are being protected in accordance with Section 121(d) of SARA.

SECTION 8, IMPLEMENTATION

The remedial actions selected by this ROD may be implemented by EPA or the potential responsible parties (PRPs). If the remedial actions are to be implemented by the PRPs, a Consent Decree will be negotiated between the PRPs and EPA and the U.S. Department of Justice.

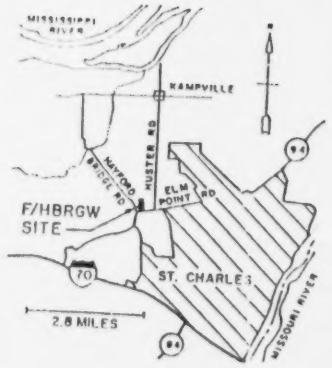
The EPA will consider a phased implementation of these remedial actions. The initial stage would likely consist of installing one or more extraction wells with the treatment and piping required for discharge to the local sewage treatment plant. After a short period of pumping a decision will be made on the number and location of additional extraction wells. The removal of contaminated surface soils would likely follow after all necessary extraction wells had been installed.

The Regional Administrator retains the authority to make changes in the scope and nature of the actions undertaken at this site. If new information of additional data is received by EPA, the selected remedial actions will be reviewed and additional response or remedial actions may be considered in light of the new data or information.



SITE PLAN

LEGEND



LOCATION MAP

F/HBRGW Record of Decision

Figure 1

FIGURE 1-1
SITE PLAN AND LOCATION MAP
FINDETT/HAYFORD BRIDGE ROAD GROUND WATER OUS

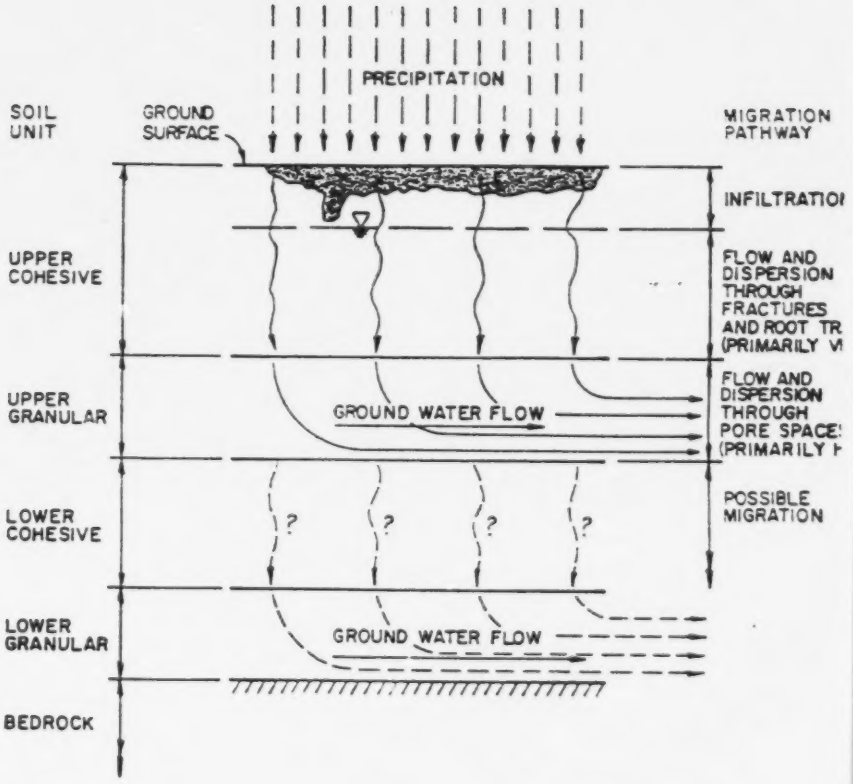
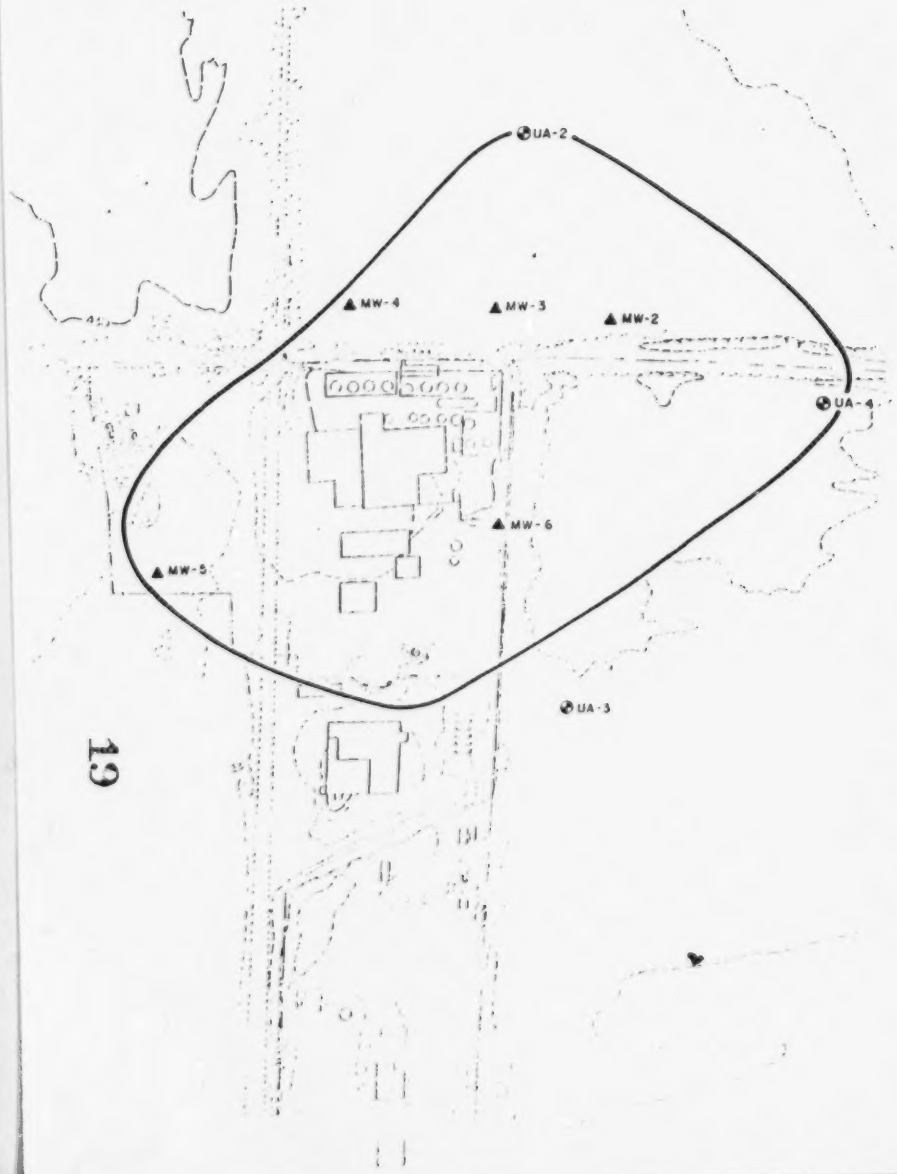


Figure 2

FIGURE 2-7
CONCEPTUAL CONTAMINANT MIGRATION PATHWAY
FINDETT/HAYFORD BRIDGE ROAD
GROUND WATER OUFS



LEGEND

Phase I EE Shallow Ground Water System Monitoring Wells, 1987

Monitoring Well Installed by the Fluor Corporation, 1983, 1984

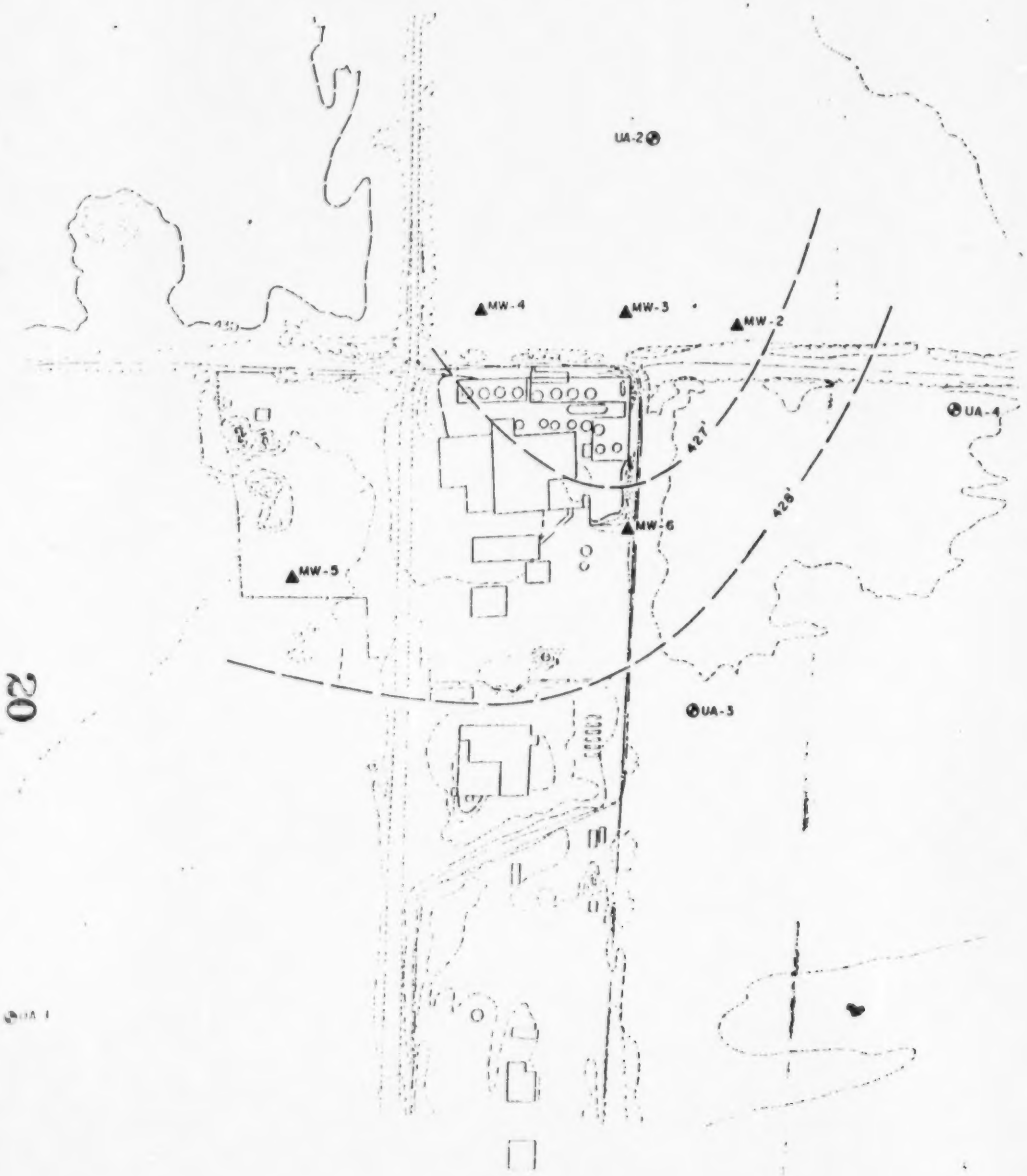
Area of Known Contamination for Most Probable Site Conditions

NOTE

The area of known contamination represents the area where the concentrations of contaminants are above MCLs or Missouri Drinking Water Standards. The limits of the area were determined based on ground water contaminant concentrations detected in the monitoring wells and borings on Gratiot property.

This figure is for illustrative purposes. The area outlined may not represent the actual extent of contamination, only the extent which is currently known.

FMRRA Record of Decision
Figure 3



LEGEND

GROUND WATER ELEVATION CONTOUR

GROUND WATER FLOW DIRECTION

PHASE I AS SHALLOW GROUND WATER SYSTEM MONITORING WELLS, 1987

MONITORING WELL INSTALLED BY THE FINDLEY CORPORATION, 1983, 1984

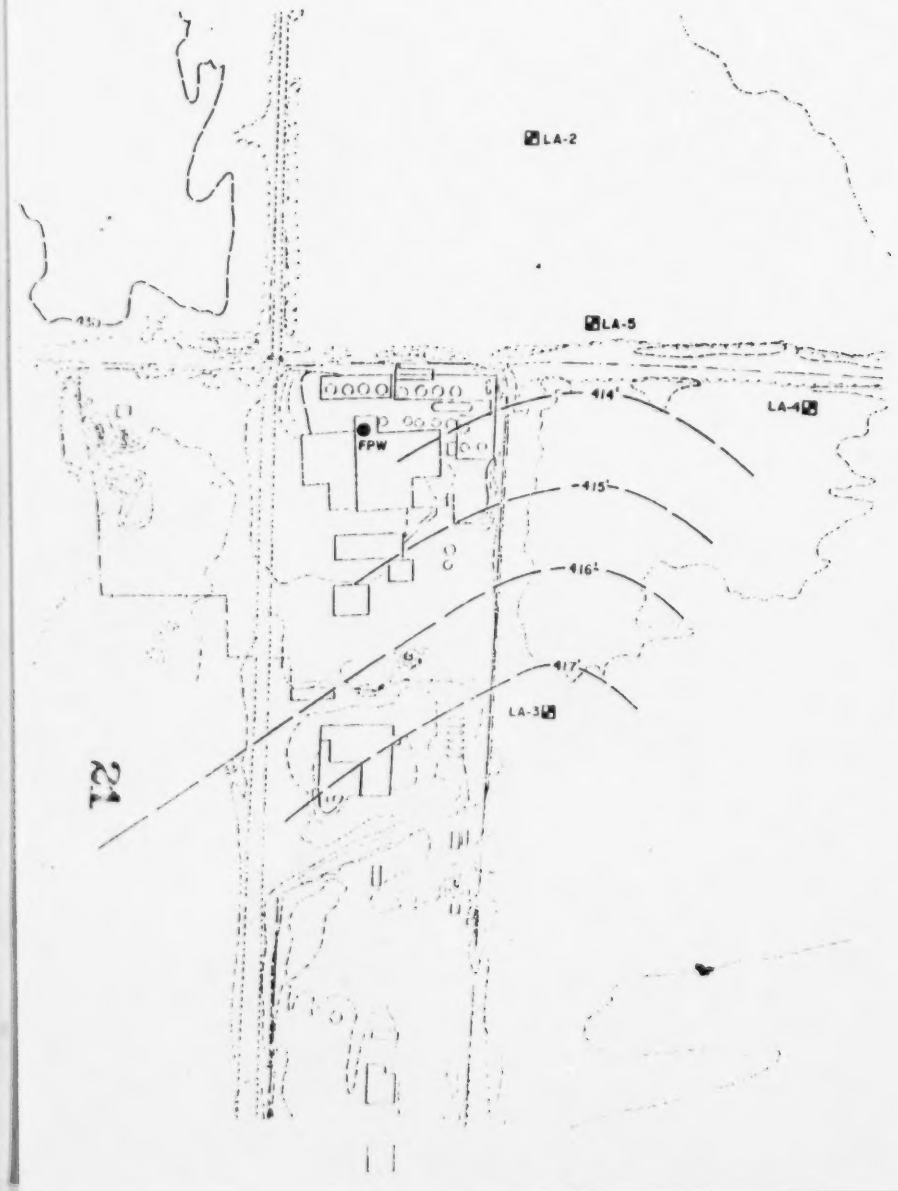
NOTE

DASHED LINES REPRESENT APPROXIMATE CONTOURS

F/HBrOW record of [illegible]

Figure 4

FIGURE 2-2
TYPICAL GROUND WATER ELEVATION CONTOURS
SHALLOW SYSTEM
FINDETT / HAYFORD BRIDGE ROAD GROUND WATER OU'S



LEGEND

GROUND WATER ELEVATION CONTOUR

GROUND WATER FLOW DIRECTION

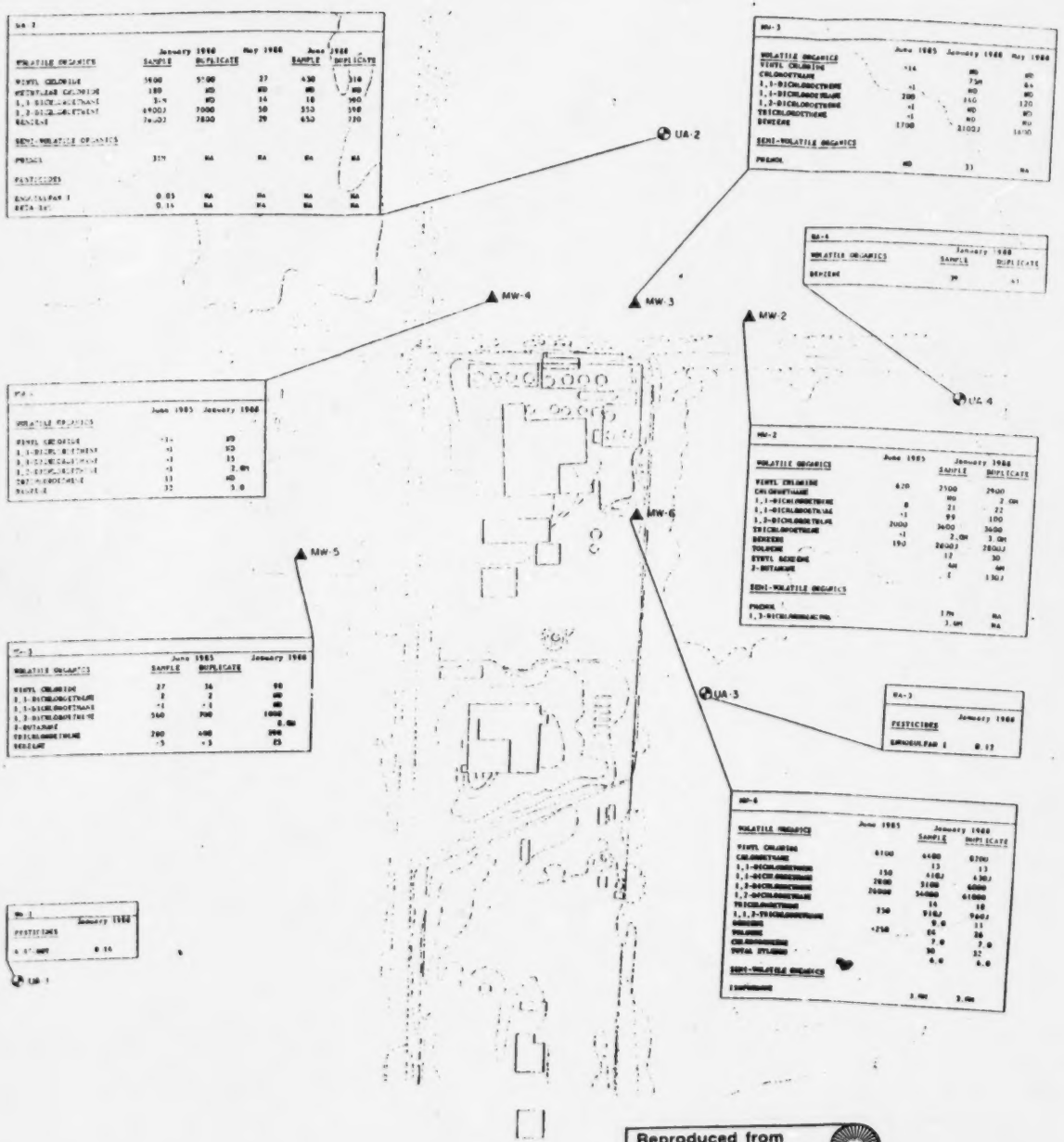
PHASE I OU LOWER GROUND WATER SYSTEM MONITORING WELL, 1987

FINNETT CORPORATION PRODUCTION WELL (FPW), 1970

NOTE

DASHED LINES REPRESENT APPROXIMATE CONTOURS

F/FBrGW Record of Decision
Figure 5



LEGEND

NOTES

1. All concentrations in ppb (ug/l).
2. 1,2-Dichloroethene is total and therefore includes cis- and trans-Dichloroethene.
3. Results from metals analysis are not shown.
4. Wells sampled in June 1985 by EPA were MW-2, MW-3, MW-5 and MW-6. Analysis performed was for all priority pollutants. See CH2M Hill, "Final Work Plan for Phase I Remedial Investigation Findett Corporation Site, St. Charles, MO", June 1985.
5. Wells sampled by EPA in January 1986 which monitored the upper ground water system are shown on this sheet. For a description of analysis performed, refer to Table 3-2.
6. Wells sampled by EPA in May 1986 which monitored the upper ground water system were UA-2 and MW-3. Analysis performed was to detect volatile organic compounds only.
7. Well sampled by EPA in June 1986 which monitored the upper ground water system was UA-2. Analysis performed was to detect volatile organic compounds only.

Data Qualification Codes

N - Compound was qualitatively identified, however, quantitative value is less than contract required detection limits (CRP data), or value is less than limit of quantitation (EPA data).

J - Compound was qualitatively identified, however, compound failed to meet all QA criteria and therefore is only an estimated value.

UU - The material was analyzed for, but was not detected.

I - The data are invalid (Compound may or may not be present). Resampling and/or reanalysis is necessary for verification.

NA - Sample was not analyzed for this compound.

Blank - No results reported.

F/HB&GW Record of D
Figure 6, 1 of 2 pa

FIGURE 5-1
PHASE I RI AND 1985
GROUND WATER CONTAMINANT S
UPPER GROUND WATER SYSTEM
FINDETT/HAYFORD BRIDGE ROAD GROUN

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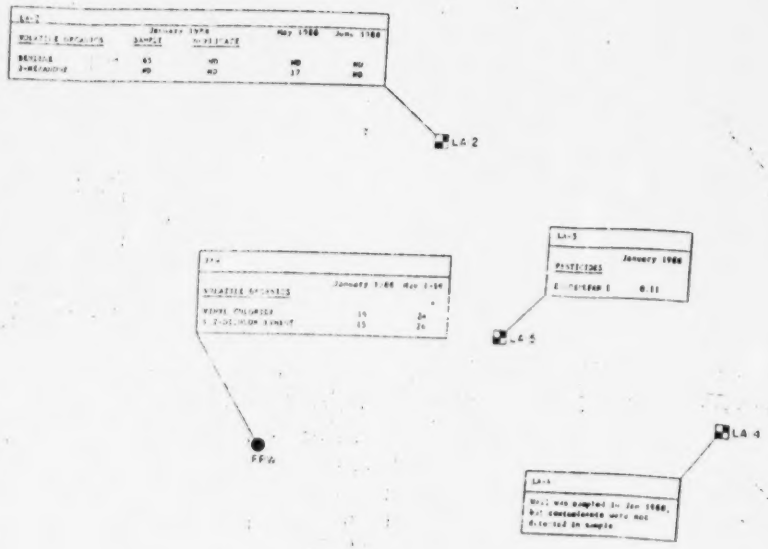
best available copy.



LEGEND

- Phase I RI lower aquifer water system monitoring well
- Rodale Corporation Production well (PW-2)

NOTES

1. All concentrations in ppb (ug/l)
2. 1,2-Dichloroethene is total and includes its cis- and trans-Dichloroethene.
3. Results from metals analysis are not shown.
4. Wells sampled by EPA in January 1988 which monitored the lower ground water system are shown on this figure. For a more detailed the analysis performed, refer to Table 3-5.
5. Wells sampled by EPA in Nov 1988 which monitored the lower ground water system were LA-2, LA-3 and the Phase I RI production well. Volatile organic analysis was performed.
6. Well sampled by EPA in June 1988 which monitored the lower ground water system was LA-[illegible] Analysis performed was Chloroform only.

DATA QUALIFICATION CODES

B - Compound was qualitatively identified. However, quantitative value is less than control required detection limits (CRDL) but greater than zero or value is less than limit of quantitation (LOQ) for a non-[illegible].

J - Compound was qualitatively identified. However, [illegible] failed to meet all QA criteria and therefore is only an estimated value.

ND - The material was analyzed for, but was not detected.

R - The data are invalid [illegible] or may not be a real [illegible] and/or reanalysis of new samples for verification.

NA - Sample was not analyzed for this compound.

Figure 6, 2 of 2 pages

FIGURE 5-2
PHASE I RI
GROUND WATER CONTAMINANT [illegible]
LOWER GROUND WATER SYSTEM
FINLEY/MONTFORD AVENUE [illegible]

TABLE 6-3
DETAILED ASSESSMENT OF ALTERNATIVES

CRITERIA	ALTERNATIVE 1: NO ACTION	ALTERNATIVE 3: HYDRAULIC CONTROL - BARDENNE CREEK DISCHARGE	ALTERNATIVE 4: HYDRAULIC CONTROL - MISSISSIPPI RIVER POTW DISCHARGE	ALTERNATIVE 6: HYDRAULIC BARRIER - BARDENNE CREEK DISCHARGE	ALTERNATIVE 7: HYDRAULIC [illegible] - MISSISSIPPI RIVER POTW [illegible]
SHORT TERM EFFECTIVENESS					
o Protection of workers during remedial activities	Since no construction would be required there would be no adverse effects to workers.	Respiratory and dermal protection (Levels C & D) would be required during installation of wells and onsite piping. Remaining work should pose only usual hazards associated with construction.	Same as Alternative 3	Same as Alternative 3.	Same as Alternative 3
o Protection of community during remedial activities	Would have no greater adverse effects to the community than those which are currently possible as a result of the continued migration of the known contamination.	Would have no measurable adverse effects to community during implementation. Contaminants are located onsite or in currently undeveloped areas where public would have only limited access. Discharge levels to creek are below levels which would be harmful to humans if creek were to be used for boating. If industrial or agricultural wells are placed near site, extraction wells should still be able to provide hydraulic control of known contamination. Emissions from air stripper should not have significantly adverse effects on air quality in the area.	Same as Alternative 3, except discharge levels to sewer system should not be harmful to persons working in the sewers or at the treatment plant.	Same as Alternative 3, except new wells may change the direction contamination migrates and contamination might not be intercepted by hydraulic barrier.	Same as Alternative 6, except [illegible] charge levels to sewer system should not be harmful to [illegible] working in the sewers or at the treatment plant
o Environmental impacts	Would have no greater adverse effects to the environment than those which are currently possible as a result of the continued migration of the known contamination. Surface water contamination is beyond the scope of this operable unit	Should have minimal environmental impact. Discharge should have little effect on Bardenne Creek. Extraction wells would prevent screening of known contamination and would remove some of the contamination from the shallow system. Would prevent contaminants from migrating to down-gradient areas. Some drawdown of water table in area of site would occur. Sludge containing metals would be formed which would need to be disposed	Same as Alternative 3, except the discharge from the Mississippi River POTW should have little effect on the Mississippi River and no metal containing sludge will be formed.	Same as Alternative 3.	Same as Alternative 4

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TABLE 6 3 (Continued)
DETAILED ASSESSMENT OF ALTERNATIVES

CRITERIA	ALTERNATIVE 1. NO ACTION	ALTERNATIVE 3 HYDRAULIC CONTROL - HARDEBEK CREEK DISCHARGE	ALTERNATIVE 4. HYDRAULIC CONTROL - MISSISSIPPI RIVER PATH DISCHARGE	ALTERNATIVE 6. HYDRAULIC BARRIER - HARDEBEK CREEK DISCHARGE	ALTERNATIVE 7. HYDRAULIC BARRIER - MISSISSIPPI RIVER PATH DISCHARGE
LONG TERM EFFECTIVENESS AND PERMANENCE					
o Time until remedial action objectives are achieved	Would not meet remedial action objective at any time	Containment action objectives achieved in 12 18 months.	Containment action objectives achieved in 10 16 months.	Containment action objectives achieved in 12 18 months	Containment action objectives achieved in 10 16 months
o Magnitude of residual risk	Residual risk should equal current risk since no actions are performed to reduce risk.	Actual magnitude of residual risk cannot be determined since the total amount of contamination present has not been determined. As long as remedial action continues to be implemented, the risks would be less than if no actions are implemented.	Same as Alternative 3	Same as Alternative 3.	Same as Alternative 3
o Adequacy of control measures	Not Applicable	Treatment facilities should be able to meet required discharge limits. Sizes of treatment units based on maximum levels detected during Phase I RI. Actual levels of contaminants to the treatment plant could be less as result of dilution. Long term management of treatment plant and wells would be required on an ongoing basis. Typical operation and maintenance functions associated with treatment facilities would be required.	With GAC filter, same as Alternative 3. Less flexibility to address deviations in ground water quality and in meeting discharge limits if the GAC filter is not included in the treatment process as a polishing step.	Same as Alternative 3	Same as Alternative 4
o Reliability of control measures	Not Applicable	All components are reliable and should not need replacement if properly maintained.	With GAC filter, same as Alternative 3. May not be able to remove semi-volatiles to appropriate levels if GAC filter is not provided as polishing step.	Same as Alternative 3, except not as reliable if the ground water flow direction is different from the MPSC.	With GAC filter, same as Alternative 4. May not be able to remove semi-volatile to appropriate levels if GAC filter is not provided as polishing step

TABLE 6 3 (continued)
DETAILED ASSESSMENT OF ALTERNATIVES

CRITERIA	ALTERNATIVE 1. NO ACTION	ALTERNATIVE 3. HYDRAULIC CONTROL - HARDEMAN CREEK DISCHARGE	ALTERNATIVE 4. HYDRAULIC CONTROL - MISSISSIPPI RIVER PATH DISCHARGE	ALTERNATIVE 5. HYDRAULIC BARRIER - HARDEMAN CREEK DISCHARGE	ALTERNATIVE 7. HYDRAULIC BARRIER - MISSISSIPPI RIVER PATH DISCHARGE
REDUCTION OF TOXICITY, MOBILITY AND VOLUME (TMV)					
o Treatment processes used	Not applicable since no treatment processes are used.	This alternative includes two air strippers to reduce VOC levels to acceptable levels for surface water discharge. A carbon adsorption is provided as a polishing process for the VOCs and to remove the semi-volatiles. An inclined plate separator is included to reduce metals concentrations to levels acceptable for surface water discharge.	Same as Alternative 3, except metals are not removed prior to discharge. Semi volatiles may not be removed if a GAC filter is not provided as a polishing step.	Same as Alternative 3	Same as Alternative 4
o Amount of hazardous material destroyed or treated	Not applicable since no material is destroyed or treated.	Amount of hazardous material treated cannot be determined at this time. No material is expected to be destroyed	Same as Alternative 3	Same as Alternative 3.	Same as Alternative 3
o Degree of expected reduction in toxicity, mobility, or volume	No reduction is expected	Within the shallow system, the mobility of the contaminants would be reduced. Since the contaminated ground water would be removed by extraction, the volume of contaminants in the shallow system would also be reduced.	With GAC filter, same as Alternative 3. May not remove semi volatile to appropriate levels if GAC filter not provided as polishing step.	Same as Alternative 3, except will withdraw lesser volumes of contaminants per volume of groundwater since the wells are located outside the area of known contamination and farther from the potential sources. If the direction of ground water changes, the barrier would no longer be effective in reducing mobility.	With GAC filters, same as Alternative 6. May not remove semi volatiles to appropriate levels if GAC filter is not provided as polishing step
o Irreversibility of the treatment	Not applicable	The amount of contaminants in the ground water would be reduced permanently. The VOCs would be removed from the ground water and volatilized. Some VOCs, semi volatiles, and metals would be transferred to sludges requiring disposal.	Same as Alternative 3, except metals would not be removed and transferred to a sludge	Same as Alternative 3.	Same as Alternative 4

TABLE 8-3 (continued)
DETAILED ASSESSMENT OF ALTERNATIVES

CRITERIA	ALTERNATIVE 1: NO ACTION	ALTERNATIVE 3: HYDRAULIC CONTROL - HARDEMAN CREEK DISCHARGE	ALTERNATIVE 4: HYDRAULIC CONTROL - MISSISSIPPI RIVER PATH DISCHARGE	ALTERNATIVE 6: HYDRAULIC BARRIER - HARDEMAN CREEK DISCHARGE	ALTERNATIVE 7: HYDRAULIC BARRIER - MISSISSIPPI RIVER PATH DISCHARGE
o Type and quantity of residuals remaining after treatment	Not applicable.	Residuals remaining would include: TOCs - concentration levels in effluent will be at or below levels listed in Table 8-1. Metals - arsenic, magnesium and iron would not exceed values in Table 8-1. Sludge would have concentrated levels of metals. Semi-volatiles - Effluent would contain low levels. Phenol would be below the standard in Table 8-1.	Residuals remaining would include: TOCs - concentrations would be at or below levels required for discharge to POTW. Semi volatiles - Effluent would contain low levels.	Same as Alternative 3	Same as Alternative 4
IMPLEMENTABILITY					
o Technical feasibility	No construction or equipment would be required. Existing monitoring wells could be used to monitor contamination movement.	No unusual construction requirements, components are proven reliable. If additional remedial action is necessary, extraction well network and treatment facility can be modified to fit a different purpose such as restoration. Combinations of existing and new monitoring wells and piezometers would be required to evaluate effectiveness of remedy.	Same as Alternative 3, except delays could occur if GAC unit is not included in design and bid package and then determined to be needed after startup.	Same as Alternative 3.	Same as Alternative 4
o Administrative feasibility	No coordination with Federal, State, or local official required because no actions are implemented. Some review of monitoring by EPA may be required.	Requires coordination with State for NPDES permit. No other identified permit requirements. Requires coordination with at least 2 local landowners for siting extraction wells and pipeline to creek. Extraction wells could interfere with current land uses.	Coordination with local wastewater authorities required for establishment of discharge limits and permission to discharge to POTW. Coordination with at least 2 local landowners for siting extraction wells. Extraction wells could interfere with current land uses.	Same as Alternative 3, except coordination with at least 3 local landowners required for siting extraction wells and may interfere with current land uses.	Same as Alternative 6, except coordination with at least 3 local landowners required for siting extraction wells and may interfere with current land uses
o Availability of services and materials	No resources are required because no actions are implemented.	Extraction wells require hazardous waste-qualified driller. Double lined pipelines are commonly available. Treatment equipment readily available from vendors and can be skid mounted for ease of transport and set up at the site.	Same as Alternative 3.	Same as Alternative 3.	Same as Alternative 3.

8-19

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TABLE 8 3 (continued)
DETAILED ASSESSMENT OF ALTERNATIVES

CRITERIA	ALTERNATIVE 1: NO ACTION	ALTERNATIVE 3: HYDRAULIC CONTROL - BARDENNE CREEK DISCHARGE	ALTERNATIVE 4: HYDRAULIC CONTROL - MISSISSIPPI RIVER POTW DISCHARGE	ALTERNATIVE 5: HYDRAULIC BARRIER - BARDENNE CREEK DISCHARGE	ALTERNATIVE 7: HYDRAULIC BARRIER MISSISSIPPI RIVER POTW DISCHARGE
COMPLIANCE WITH ARARS					
o Compliance with action-specific ARARs	Since no actions would be implemented, there are no action-specific ARARs to comply with.	Treated ground water discharged to Bardenne Creek would comply with all NPDES requirements for discharge to surface waters including contaminant limits and sampling frequency. Other RCRA requirements for ground water monitoring, double-lined pipelines with leak detection and sludge disposal would also be met	Treated ground water discharged to the Mississippi River POTW sewer system would comply with all contaminant limits established by local ordinances and wastewater officials. The need for a GAC filter to comply with these contaminant limits will be determined during implementation. Other RCRA requirements for ground water monitoring, double lined pipelines with leak detection, and sludge disposal would also be met.	Same as Alternative 3	Same as Alternative 6
PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT					
o How alternative provides human health and environmental protection	The Ela Point well field, a drinking water source, may be threatened if the known ground water contamination is not contained and allowed to migrate downgradient. Without containment, the contamination and loss of potential use of downgradient ground water could be expected to occur. No action specific ARARs would have to be met.	Migration of the known ground water contamination toward the Ela Point well field, a source of drinking water, would be prevented. Additional deterioration of ground water near the site would be prevented because the contamination would be contained within the known limits. All action-specific ARARs for management of hazardous wastes and surface water discharges would be achieved.	Same as Alternative 3, except all action specific ARARS for management of wastes and discharge to the Mississippi POTW would be achieved. Additional risk may be present if GAC filter is not provided as a polishing step. If contaminants not removed by air stripper are present in concentrations which could not be effectively treated or removed by the POTW.	The hydraulic barrier would prevent migration of the known contamination toward the Ela Point well field, a drinking water source provided there are no changes in ground water flow direction. Additional deterioration of downgradient ground water would be prevented by the barrier. All action-specific ARARs for management of hazardous wastes and surface water discharges would be achieved.	Same as Alternative 6, except all action specific ARARs for management of wastes and discharge to the Mississippi POTW would be achieved. Additional risk may be present if GAC filter is not provided as a polishing step
APPLICABILITY TO OVERALL SITE REMEDIATION					
o Ability to meet objectives of a comprehensive remedial action	Lack of containment is likely to increase the costs of a final remedy at the site since the extent of contamination will increase and may result in contamination of public drinking water supply	Could meet the objectives of a comprehensive remedial action for total site remediation if a source control action was implemented in conjunction with the containment action (active restoration). Very good set up for inclusion into a comprehensive remedial action. Proper extraction well locations for hydraulic control could be well suited for effective contaminant removal	Same as Alternative 3.	Would prevent the migration of contaminants and protect the Ela Point well field. However, downgradient barrier extraction wells are not as effective for contaminant removal for overall site remediation as extraction wells used for hydraulic control.	Same as Alternative 6

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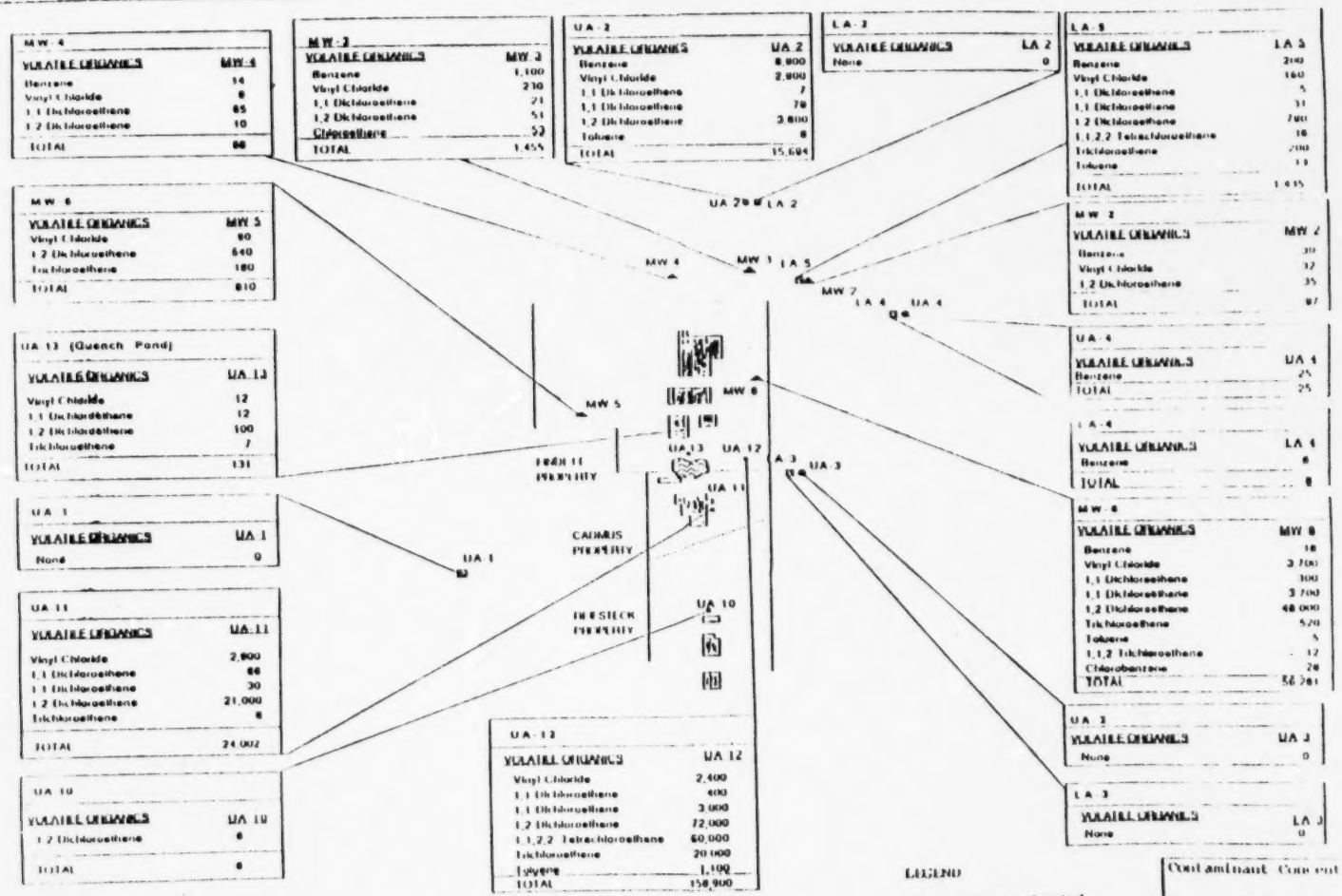

Units of concentration are in ppb

SITE PLAN

FINDETT/HAYFORD BRIDGE ROAD

Contamination Concentrations

Figure 3

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TABLE 1

SOIL ANALYSIS SUMMARY*

Location:	UA-11	UA-11	UA-12	UA-12	UA-13	UA-13
Depth:	10 Feet	20 Feet	10 Feet	20 Feet	10 Feet	20 Feet
Sample No:	T4995002	T4995004	T49950019	T4995021	T4995028	T4995030
Compound						
Vinyl Chloride	10	130	2,700	360	740	120
1,2-Dichloroethene	110	2,300	87,000	22,000	2,500	16,000
Carbon Disulfide		5.4			11	
Methylene Chloride						1,600
Acetone			1,500	270		270
1,1 Dichloroethene			55	70	100	4,300
1,1 Dichloroethane			48	39	270	17,000
2-Butanone			490	200		270
1,1,1 Trichloroethane					31	150,000
1,1,2,2,-Tetrachloroethane			100,000	52,000	67	160
1,2Dichloroethane					330	
Trichloroethene			46,000	35,000	17	230,000
1,1,2-Trichlorethane			280	1,300		1,600
Benzene			62	140	24	250
4-Methyl-2-Pentanone				830	2,200	160
Tetrachloroethene			3,900	8,000		120
Toluene			3,600	1,900	58	2,400
Chlorobenzene			170	360	530	1,200
Ethyl Benzene			35	220		
Total Xylenes			93	610	11	29
Chloroform				14		58
Total	120	2,435.4	246,763	124,694	4,508	425,707

*Only VOCs found above quantitation limits are shown.

RESPONSIVENESS SUMMARY

Record of Decision (ROD) for
Findett/Hayford Bridge Road Ground Water
St. Charles, Missouri

This Responsiveness Summary presents the responses of the Environmental Protection Agency (EPA) to public comments received regarding the proposed remedial actions, for the operable unit of contaminated shallow ground water, at the Findett/Hayford Bridge Road Ground Water site in St. Charles County, Missouri. This document addresses all substantive comments received by the EPA during the public comment period.

A remedial investigation/feasibility study (RI/FS) was conducted on this site by EPA. A Proposed Plan was developed by EPA, which made recommendations on the remedial actions for the site. The RI and FS reports and the Proposed Plan were released for public review and comment for a 21-day period which began on November 16, 1988, with public notices in St. Charles and St. Louis newspapers. A public meeting was held by EPA in St. Charles on December 5, 1988. A number of verbal comments were received by EPA during that public meeting. The only written comments received were from the Findett Corporation.

The following are the substantive public comments, and EPA's response, to the RI and FS reports and the Proposed Plan for remedial action.

1. Comment: A commenter noted that five extraction wells were recommended in the Proposed Plan. Given the limited amount of hydrogeologic data available on the site, the commenter recommended that initially a single extraction well be installed and pumped. The commenter further recommended that the need and location of any additional extraction wells be determined after review of data from an initial period of pumping the single extraction well.

EPA Response: The EPA agrees that there is some benefit to installing a single extraction well, or a few extraction wells initially, and determining the need for additional extraction wells after a period of initial pumping. This essentially relates to the phasing or sequencing of extraction well installation. If EPA receives a "good faith offer" from the potential responsible parties for the installation of a single extraction well initially, to be followed by an evaluation of pumping data to determine the need and location of additional extraction wells, EPA would give serious consideration to accepting that offer. In essence, EPA believes this to be a relatively minor detail, close enough to the remedy recommended by EPA in the Proposed Plan, to be accepted by EPA. Critical to the acceptability of this rationale to EPA will be the commitment that all necessary extraction wells will be installed.

and that the reason for installing a single well initially is to better determine the number and location of the rest of the extraction wells.

2. Comment: A commenter noted that the data now available indicates that there may be additional contaminant sources, in addition to the Findett facility. The commenter recommended that EPA pursue investigation of these other suspected contaminant sources.

EPA Response: The EPA agrees that the available data now indicates that there may be other contaminant sources, in addition to Findett, including but not limited to the Cadmus Corporation facility. The EPA is actively pursuing these other potential contaminant sources. Once sufficient evidence is available, EPA would seek to include them in the remedial actions at this site. However, in acknowledging the possible existence of additional contaminant sources, EPA notes that the highest levels of volatile organic compound (VOC) contamination in both soil and water have been found on the Findett facility.

3. Comment: A commenter asked if the deep production well at the Findett facility had been tested for contamination, and if so what the results of such testing were.

EPA Response: The EPA sampled the Findett production well as part of the remedial investigation. Trace levels (15 and 24 ug/l 1,2-dichloroethene and 16 and 24 ug/l vinyl chloride) of VOCs were found.

4. Comment: A commenter asked if the analytical data on the testing of the public drinking water supply from the Elm Point Well Field was available to the public.

EPA Response: The water supply is occasionally tested for contamination by the City or the State, however not for all of the contaminants which have been found at this site. The EPA has tested water from the Elm Point Well Field twice, once in January 1988 and again in November 1988. No VOCs were found at detection limits in any of the samples of the drinking water collected by EPA.

5. Comment: A related question was received as to whether there were plans for regular testing of this public drinking water supply.

EPA Response The drinking water program has been delegated to the State of Missouri by EPA. The State of Missouri (Department of Natural Resources) intends to sample this water supply on a quarterly basis. Analyses are to include VOCs.

6. Comment: A commenter asked if surface water samples had been collected and analyzed at the site, and how surface water contamination might affect the Elm Point Well Field.

EPA Response: A number of surface water sediment samples were collected by Findett at their facility, and by EPA at the adjacent Cadmus Corporation facility, prior to the remedial investigation. PCBs were found in the surface water and in the sediments at both Findett and Cadmus facilities. In addition VOCs were found in the water and sediments at the Cadmus facility. In reviewing the available data prior to beginning the RI, EPA determined that the surface water contamination posed much less of a threat to public health than did ground water. Therefore, the RI focused on the ground water route. Due to the impermeability of the surface clay soils, it is unlikely that surface water contamination poses a significant threat of contaminating the water of the Elm Point Well Field.

The surface water route is not directly addressed in the operable Unit Feasibility Study, or in this ROD, and will need to be addressed by EPA in subsequent operable units.

7. Comment: A commenter asked if EPA had any plans for installing additional monitoring wells, closer to the Elm Point Well Field.

EPA Response: Additional monitoring wells may be required to monitor the effectiveness of the ground water extraction program initiated. It is possible, but unlikely, that any of these wells would be closer to the well field than currently existing monitoring wells. The EPA will require continued monitoring of some of the deeper monitoring wells. Additional wells may be required if contamination is encountered.

8. Comment: A commenter asked why only shallow ground water was being addressed in the operable unit.

EPA Response: The EPA focused on the route via which public health was most directly at risk (i.e. the risk of contamination of the Elm Point Well Field drinking water). In order to contain the contamination and prevent the contamination of this drinking water supply, EPA decided to focus on the ground water route and address other routes, such as air and surface water, in subsequent operable units. Only the shallow ground water was initially found to be contaminated in the RI. In order to prevent the spread of contamination to the deeper aquifer, or spreading further in the shallow aquifer, EPA decided to contain the contamination within the shallow ground water near the site.

9. Comment: A commenter asked how extraction wells could interfere with land uses.

EPA Response: In addition to the Findett facility, the property on which extraction wells would most likely be located is a farm field to the north of Findett. The installation of extraction wells would interfere with the farming of that portion of the field. Farm equipment, such as tractors for planting or harvesting, would have to be careful to go around the well. Buildings could not be easily installed over an extraction well.

Finally, extraction wells will tend to "draw down" the shallow aquifer, or lower the water table. This would limit the availability of shallow ground water in the affected area. (At present there are no shallow production wells on the affected properties.)

10. Comment: A question was received asking that the source control measures mentioned by EPA in the public meeting be explained.

EPA Response: The source control mentioned would consist of removing contaminated soil for offsite treatment or disposal. Soils near the Findett quench pond are contaminated with PCBs and VOCs, as are portions of the Cadmus facility. Findett has removed some of the PCB-contaminated surface soils from their facility for offsite disposal. Findett has also proposed to remove additional contaminated soils from their facility and to install an impermeable cap over any residual soil contamination. In addition to reducing the potential for direct contact exposure to hazardous substances, source control would remove contaminated soil as a source of contaminant release to the ground water.

11. Comment: A related comment was received asking whether the VOC contamination of ground water was limited to the shallow aquifer.

EPA Response: At the conclusion of the RI, ground water contamination was thought to be limited to the upper aquifer, although trace levels (e.g. less than 25 ug/l) were reported in the Findett production well, which is completed in the deep aquifer. Since this unused production well may also have been completed in the upper aquifer, it is not known for sure whether the contamination came from the upper or lower aquifer, or both.

Subsequently, EPA resampled a deep monitoring well (LA5) and found 1400 ug/l of VOCs. Resampling of this well confirmed VOC contamination, but at much lower levels (61 and 69 ug/l). In summary, although some contamination of the lower aquifer is now believed to exist, much higher levels of contamination are found in the upper ground water.

12. Comment: A commenter noted that there are a number of shallow (40-60 feet deep) drinking water wells approximately 2 miles northeast of the site. The commenter asked if drinking water from these wells was at risk of contamination by releases from the site.

EPA Response: During the public meeting, during which this comment was made, the location of these wells, relative to the site, was not clear to EPA. Subsequently, EPA has received additional information from the County more clearly locating these wells. The wells in question are located in, or just south of the community of Kampville. These private drinking water wells would be about 2 miles northeast of the site, and at least 1 1/2 miles northeast of the Elm Point Well Field. Although this

may be downgradient of the site, it is very unlikely that contaminants from this site would reach these wells at concentrations above laboratory detection limits. The EPA will consider the need for testing these wells after reviewing continued testing of monitoring wells at the site and of the Elm Point Well Field wells.

13. Comment: A commenter asked how well the upper and deeper aquifers were defined near the site.

EPA Response: Within the area defined by the ground water monitoring network installed by EPA in the RI, there appear to be two distinct aquifers, an upper aquifer in the upper sands, separated by the lower clay layer, from the deeper aquifer in the lower sands extending down to bedrock. The degree of connection, if any, between the upper and deeper aquifers has not been determined and continues to be evaluated.

The EPA recognizes that this geologic setting may be fairly localized. For example, the layers of subsurface soils encountered at the Elm Point Well Field, 1800 feet northeast of the site, were significantly different. The lower clay layer was not encountered in these wells. Boring logs for these drinking water wells reported a surficial layer of clay, underlain by silt, then sand, gravel, boulders and then bedrock. A single aquifer exists at the Elm Point Well Field. Thus it appears as if the lower clay separating the upper sand aquifer from the lower sand aquifer beneath the site, pinches out before reaching the well field 1800 feet to the northeast.

14. Comment: A commenter inquired as to the nature of the Findett operations.

EPA Response: Originally Findett reclaimed heat transfer fluids or oils, some of which contained polychlorinated biphenyls (PCBs). Findett also received some waste solvents for reclamation or recycling. Findett has not been involved in either of these types of activities since 1980. At the present time Findett custom blends or manufactures organic chemicals for other companies, using chemicals or raw materials received from that client or customer.